

First confirmed records of the Western Hooded Scaly-foot *Pygopus nigriceps* from New South Wales

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ABSTRACT

The Western Hooded Scaly-foot *Pygopus nigriceps* is a widespread pygopod concomitant with the sandy arid zone of inland and western Australia. The limited suitable habitat available and inaccessibility of north western New South Wales means that the occurrence of *P. nigriceps* has long gone undetected in the state. This is despite ecological work and fauna surveys having been conducted within this area. Here I report two records of *P. nigriceps* from far north western NSW (Sturt National Park and Winnathee Station), which are the only known confirmed records to date. This brings the number of known pygopods in NSW to 12 species.

Key words: Pygopodidae, desert, legless lizard, cryptic species.

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Introduction

The family Pygopodidae, commonly referred to as Flap-footed Lizards are a unique radiation of lizards found almost exclusively within Australia with 44 species represented from 7 different genera (Cogger 2014). In Australia, pygopods are found throughout the mainland from temperate woodlands, humid savannas, across the arid interior of the continent and reaching their greatest diversity in the south west corner of Western Australia where the most ideal habitat of grasslands and heath on sandy substrates dominate (Cogger 2014). Pygopod lizards are characterised by their elongated slender body forms that entirely lack forelimbs and with vestigial hindlimbs severely reduced to scaly flaps found above the vent (Cogger 2014).

Following relatively recent taxonomic clarification, the genus *Pygopus*, typically known as Scaly-foots, is currently comprised of five species (James *et al* 2001, Oliver *et al* 2010). Scaly-foots are large, robust legless lizards found throughout most of continental Australia with most species being crepuscular and nocturnal and with a dietary preference for eating surface-active insects and arthropods (Patchell & Shine 1986). The Cape York Scaly-foot *Pygopus robertsi* is restricted to the dry woodlands peripheral to the rainforests of the Wet Tropics and heathlands of eastern Cape York, the Northern Hooded Scaly-foot *Pygopus steelescottii* occurs in the wet-dry tropics of northern Australia, the Common Scaly-foot *Pygopus lepidopodus* exhibits the most diurnal behaviour of all Scaly-foots and inhabits coastal and interior heath and sclerophyll

woodlands of southern and south east Australia and the Eastern Hooded Scaly-foot *Pygopus schraderi* occurs in semi-arid zones in a variety of open habitats from stony plains and dry woodlands to arid mallee and mulga scrubs and spinifex-dominated desert grasslands of inland eastern Australia (James *et al* 2001, Oliver *et al* 2010, Cogger 2014).

The Western Hooded Scaly-foot *Pygopus nigriceps* has a widespread distribution across the interior and western half of Australia with a preference for sandy arid areas, particularly in association with Spinifex grass *Triodia* spp. and on sand flats and dunes (James *et al* 2001, Pianka 2010). It is considered common, with predominantly nocturnal habits and is regarded as a scorpion specialist (Pianka 2010).

Until 2001, *P. schraderi* (originally described by Boulenger 1913 but synonymised with *P. nigriceps* by Kinghorn 1926) was previously considered an eastern subspecies of *P. nigriceps* and was not recognised in field guides (Kluge 1974, Cogger 2000; but see Ehmann 1992). The western and eastern forms of *P. nigriceps* were regarded as being loosely partitioned from the 135° E meridian (Kluge 1974). James *et al.* (2001) found significant genetic divergence to warrant separate species status based on electrophoresis analysis. Morphologically, *P. nigriceps* is differentiated from *P. schraderi* by the absence of keeled scales, the nostril being fully enclosed by the nasal scale (as opposed to contacting the first supralabial scale), fewer than 14 pre-anal scales

and having 120 or more pairs of ventral scales (James *et al.* 2001). In life, *P. nigriceps* has a characteristically dark pigmented band between the eyes and a prominent nuchal band (which can fade with age) which is absent and less distinct in *P. schraderi*, respectively. *Pygopus nigriceps* do not have distinct body patterning but *P. schraderi* can be strongly marked with a longitudinal series of alternating light or dark brown pigmented scales on the dorsal surface and usually a continuous stripe along the vertebral line (James *et al.* 2001). *P. nigriceps* is now considered as occurring west of 136° E within the central and western arid zone and from the far south-western corner of QLD. *P. schraderi* occurs west of the Great Dividing Range in NSW and Victoria, east of 135° E and south of 17° S (James *et al.* 2001).

Despite the elevation of *P. schraderi* to full species status (James *et al.* 2001), the species coding classification of the National Parks and Wildlife Service Atlas of the New South Wales Wildlife database species did not reflect the taxonomic change until October 2005 (J. Sherratt pers. comm.). Consequently, records of *P. schraderi* continued to be incorrectly assigned as *P. nigriceps* for several years following the taxonomic revision. Identification of *P. schraderi* was further impeded by the persistence of outdated field guides and lack of readily available updated dichotomous keys which were not updated until more than a decade later (Cogger 2014, Swan *et al.* 2017). Consequently, and particularly in the absence of corresponding specimens or photographs, previous observational records of *P. nigriceps* in the Atlas of the New South Wales Wildlife database (OEH 2020) remain unverifiable and are likely to be of *P. schraderi*. Furthermore, given the distinct habitat preferences of both species; *P. nigriceps* as an arid zone specialist, whilst *P. schraderi* occurs in the plains and woodlands of the semi-arid zone on heavy clay and stony soils, it is highly likely that all records of *P. nigriceps* in NSW that fall outside of the arid zone are records of *P. schraderi*. Several NSW NPWS rangers responsible for many of the *Pygopus* spp. records in western NSW (Mallee Cliffs, Mungo, Oolambeyan and Willandra Lake NPs) have confirmed that their records were incorrectly registered as *P. nigriceps* due to the lack of an available species code for *P. schraderi* when the data were submitted at the time (D. Parker, D. Egan, R. Dayman pers. comm.).

Prior to my own submission of a voucher specimen (specimen number R185589), there were no substantiated records or specimens of *P. nigriceps* from NSW within the Australian Museum herpetology collection. Following the James *et al.* (2001) taxonomic revision of *P. nigriceps*, all specimens of *Pygopus* held within the collection were reviewed and those categorized as *P. nigriceps* from NSW were reassigned with strong confidence to *P. schraderi* in 2002 (G. Shea pers. comm.). Despite the absence of *P. nigriceps* records from NSW, its congeners, *P. schraderi* and *P. lepidopodus*, however, have been commonly recorded in NSW (OEH, 2020) across the semi-arid plains and woodlands on heavier stony and clay soils; and coastal and

interior heath and sclerophyll woodlands which is typical of their widely available habitat respectively (Cogger 2014).

P. schraderi is also known to occur in close regional parapatry to where *P. nigriceps* have now been recorded in the far north west corner of NSW with specimens collected from the eastern half of Sturt NP which is characterised by Mitchell Grass *Astrelba lappacea* dominated saltbush grasslands and shrublands of gibber downs and Copperburr *Sclerolaena* spp. grasslands (Plant Community Types 61 and 150 respectively; OEH 2019) of the semi-arid stony plains that is more reflective of *P. schraderi* habitat as opposed to the sandy deserts of the arid zone (Accession numbers AM-R151581, AM-R151605, AM-R152865, AM-R155416, AM-R42148 and AM-R73693). Indeed, the Simpson-Strzelecki Dunefields do serve as a climatic-ecological barrier with reflected patterns on speciation which explains this distributional parapatry (Cracraft 1991).

The prior absence of confirmed records of *P. nigriceps* from NSW, despite it being relatively common in the other states across its distribution, is possibly due to its preferred habitat of sandy soils in the arid zone being both limited in NSW and generally rarely surveyed. Previous fauna surveys in north western NSW have failed to detect this species (OEH 2009, G. Shea pers. comm.). The Simpson-Strzelecki Dunefields bioregion, whilst encompassing an area of 272,920 km², only occurs in the extreme northwest corner of NSW (Bastin 2008). Only 4% of this bioregion extends into NSW, where it forms a mere 2.65% of the state's total land area.

Here I report two records of *P. nigriceps* from NSW, which are the only known confirmed records to date.

Observations

First Record

On 5 September 2007, whilst digging a trench to establish a pitfall line, a burrow was uncovered 10 cm below the surface of a sand dune crest on Winnathee station, NSW (-29.87003° N 141.06753° E; Figure 3). A tail was seen protruding from the hole. On retrieving the rest of the animal from the burrow it was found to be an adult *P. nigriceps* (Figure 1). The habitat was comprised of Sandhill Wattle *Acacia ligulata* dominated open shrubland with a sparse ground cover of forbs including Fleshy Groundsel *Senecio gregorii* and Poached Egg Daisy *Polycalymma stuartii* (PCT 124; OEH 2019).

The animal was identified as *P. nigriceps* based on the lack of keels on the dorsal scales as opposed to the distinctly keeled dorsal scales found in *P. schraderi*. The individual was photographed and then vouchered for submission to the Australian Museum (specimen number R185589). It was identified as a male, with a snout-vent length of 186 mm and a regenerated tail length of 139 mm (85 mm of which was original). The specimen had 22 midbody



Figure 1. Adult *Pygopus nigriceps* from Winnathee Station, NSW. Photo, G. Shea.



Figure 2. Juvenile *Pygopus nigriceps* from Sturt National Park, NSW. Photo, U. Klöcker.

scales, and 125 ventral scales between the mental and the small pore-bearing precloacal scales. An image of this specimen is featured in the field guide to reptiles of NSW (Swan *et al.* 2017).

Second Record

An additional record was brought to light after initiating enquires about the possible presence of *P. nigriceps* in Sturt

National Park (NP) with then-resident PhD student Ulrike Klöcker. Her incidental records whilst pitfall trapping for Dusky Hopping Mice *Notomys fuscus* included an unidentified legless lizard. Photos were taken (Figure 2) which were identified as a juvenile *P. nigriceps* by the distinguishing features of the dark hood on the nape and dark band between the eyes. This individual was captured on 8 April 2008 in a pitfall trap in the western limit of

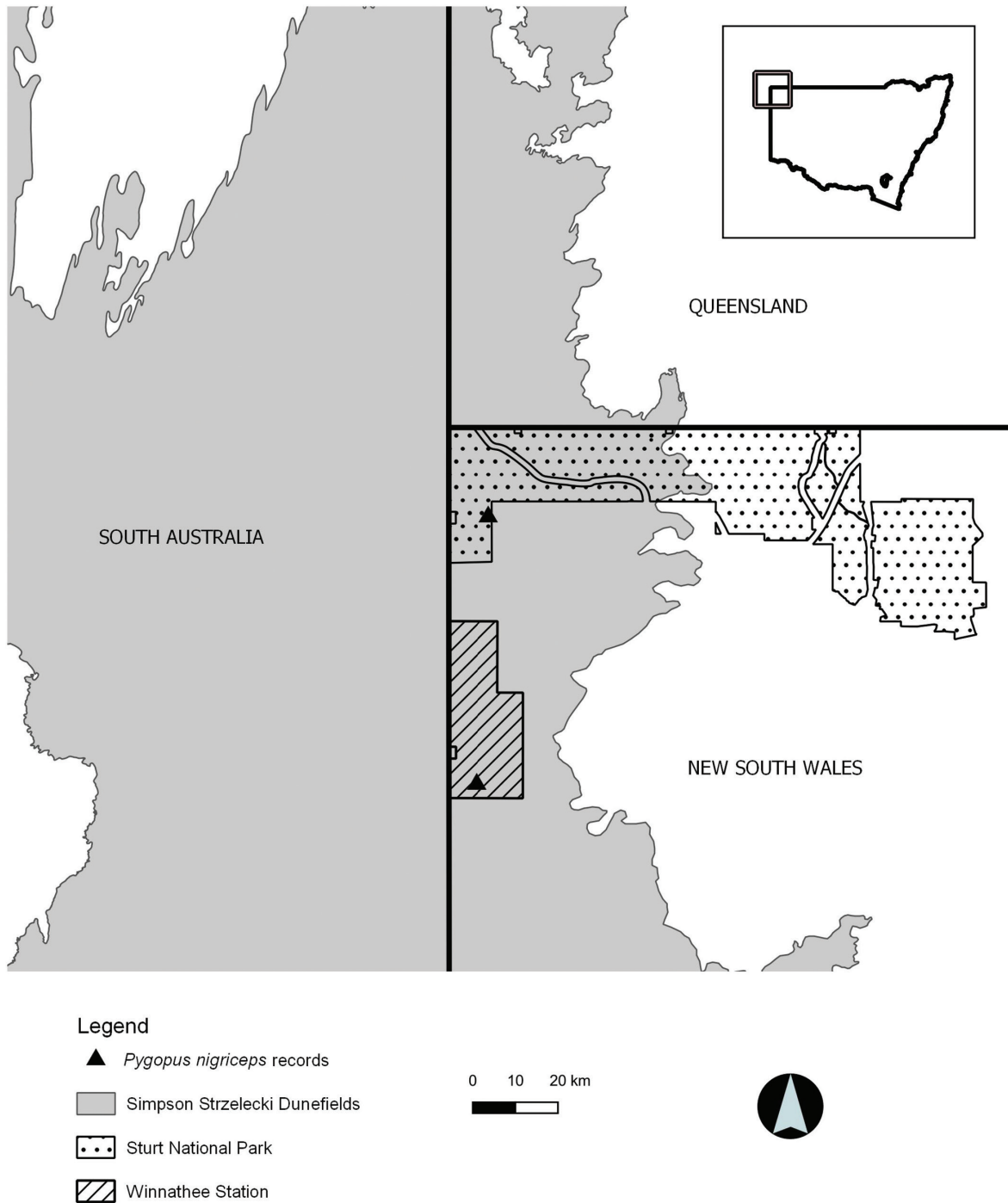


Figure 3. Confirmed records of *Pygopus nigriceps* from NSW.

Sturt NP, west of the Fort Grey Homestead and less than 10 km from the South Australian border (-29.21714° N 141.09549° E; Figure 3). This sighting was approximately 72 km due north of the initial sighting and occurred in the same PCT (124) as the Winnathee record. No further information was collected.

Conclusion

These two observations and subsequently lodged specimen confirm the presence of *P. nigriceps* in NSW (Figure 3). This brings the number of known pygopod species recognised to occur in the state up to 12 (Swan *et al.* 2017). Particularly

as some species such as pygopods remain cryptic and are not detected frequently with conventional trapping methods (Michael *et al.* 2012), this discovery highlights the possibility of other arid zone species, hitherto unreported or seldom observed, as potentially occurring within the remote northwest corner of the state.

For example, the Woma python *Aspidites ramsayi* remains infrequently recorded in the NSW extent of the Simpson-Strzelecki Dunefields bioregion given their low densities and sporadic occurrences (OEH 2005). Whereas species such as the Interior Blind Snake *Anilius endoterus* (as *Ramphotylops endoterus*), although common elsewhere

across their range, are listed as endangered in NSW (OEH 2005). It should be noted though that unlike *P. schraderi* which is listed as critically endangered in Victoria, as it is only known from a few scattered and isolated localities due to habitat clearing and fragmentation (Robertson and Coventry 2019), the paucity of *P. nigriceps* records in NSW appears due simply to their limited distribution in the state, rather than as a consequence of actually being threatened or rare. Nevertheless, the opportunity for new records and range extensions in such a dynamic region

remain possible. Fauna surveyors and naturalists alike should remain alert to the potential for such discoveries.

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